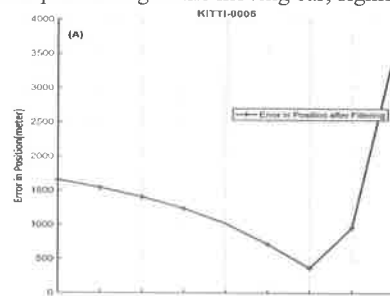


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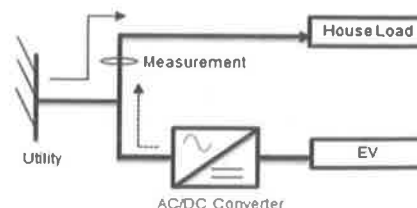
Management & Information Technology

- 553 **MEMS Gyroscope Raw Data Noise Reduction Using Fading Memory Filter** Nowadays, MEMS sensors are widely used in systems such as autonomous vehicles, but they still suffer from high stochastic errors such as Angle random walk (ARW) noise, which causes failure in real-signals and produces an error in the position and attitude of mobile systems. So far, many filters are developed to reduce the amount of noise in the output of the MEMS sensors. The computational overhead, the rate of noise reduction, and the phase-delay of the filter are the most important characteristics of choosing a suitable filter. In this paper, a low pass filter based on the alpha-beta filter with a very low computational overhead is proposed to reduce the amount of noise. In order to find the optimal filter gain, the improvement in the positioning is selected as a criterion, which is a tradeoff between the amount of noise reduction and the phase delay of the filtered signal. In this work, the KITTI database is used to evaluate the proposed filter. The results show that the proposed filter reduces the sensor's noise and improves the positioning of the moving car, significantly.



A Nazemipour & M T Manzuri

- 559 **Electric Vehicle (EV) in Home Energy Management to Reduce Daily Electricity Costs of Residential Customer** Exploiting energy storage capacity of proliferating EVs in present power system may contribute to minimize adverse impact of EV charging and electricity operating costs of residential customers. This study investigates an electric vehicle (EV) charging/discharging strategy in home energy management system (HEMS) to evaluate economic benefit of different operation modes in dynamic pricing schemes. Three different operation modes i.e. grid-to-vehicle (G2V), vehicle-to-grid (V2G) and vehicle-to-home (V2H) and their relative financial advantage using single and dual EVs are investigated without affecting customer comfort of EV for driving. The proposed economic analysis is carried out for a single residential customer for one day. Numerical studies show that reducing electricity consumption from grid in peak pricing periods using V2H is more beneficial than V2G or G2V in term of economy as selling energy to the grid is technically inflexible and financially competitive.

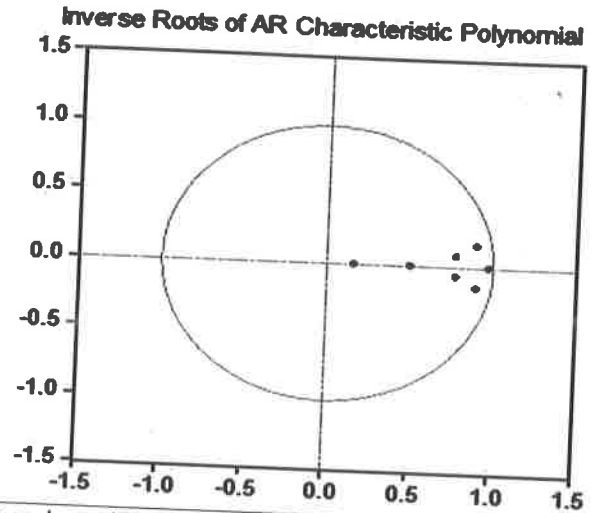


U Datta, A Kalam & J Shi

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566 VAR Analysis of the Factors Influencing the Overcapacity in the Iron and Steel Industry

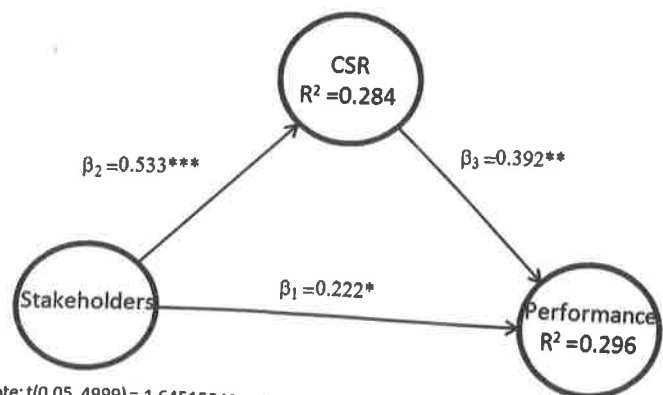
This paper selects fixed asset investment, the growth rate of real estate construction area, steel export rate, the concentration of the iron and steel industry, iron ore prices and local government investment growth indexes in a vector auto-regression (VAR) analysis of the factors influencing Chinese iron and steel overcapacity. The paper concludes that the six indicators are important factors influencing excess capacity and provides relevant future policy suggestions.



Feng Mei & Peng Chen

570 Corporate Social Responsibility and Sustainability's Effect on the Relationship Between Technological Companies' Stakeholders and Performance

This study analyses the role played by stakeholders in technology companies. These companies can contribute to building sustainable economies through proactive strategies including innovations in products and services with socially positive impacts. However, the role of stakeholders in these firms has not been studied in detail. In addition, the effect of corporate social responsibility (CSR) on competitive success is greater in more competitive industries, such as the technology sector. This research thus focused on the mediating effect of CSR on the relationship between technology companies' stakeholders and performance. A structural equations model was used to conduct the analysis. The results show that the influence of stakeholders on these companies' performance is enhanced by CSR strategies.



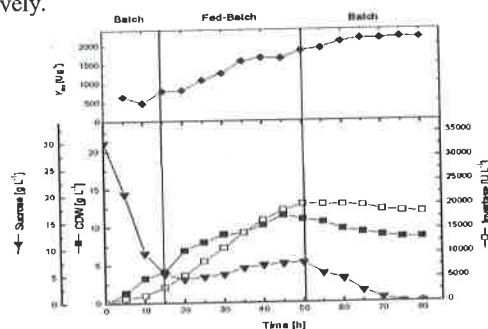
Note: $t(0.05, 4999) = 1.645158499$, $t(0.01, 4999) = 2.327094067$, $t(0.001, 4999) = 3.091863446$
 * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ns. Not significant

Carmen de Nieves-Nieto, Juan Andres Bernal-Conesa, Antonio Juan Briones Penalver & José Antonio C Santos

S & T and Industrial Research

- 575 Effects of Different Aeration Rates and Feeding Strategies on Cell Growth and Invertase Production Kinetics by *Saccharomyces boulardii*

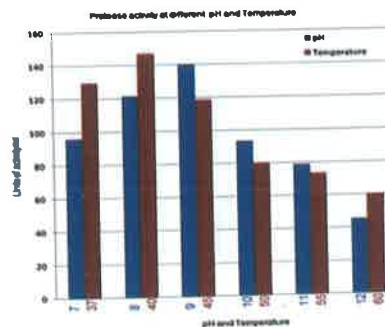
Invertase (β -D-fructofuranoside fructohydrolase; EC 3.2.1.26) constitutes an important microbial enzyme with wide applications in different food and pharmaceutical sectors. The present work used the biotechnological yeast *Saccharomyces boulardii* to produce invertase under different aeration rates in stirred tank bioreactor. Our results showed that an aeration rate of $1 \text{ v v}^{-1} \text{ m}^{-1}$ was the most suitable in terms of cell growth and invertase productivity. Highest enzyme production was recorded 14950 U L^{-1} after 50 h of cultivation. The production process was further optimized using different feeding strategies to overcome substrate limitation side effects encountered during batch cultivation. Sucrose feeding enhanced cell growth and enzyme productivity over batch cultivation by about 56.5% (from 7.35 to 11.5 g L^{-1}) and 35.5% (from 14950 to 20250 U L^{-1}), respectively. Furthermore, during feeding phase, invertase production rate was improved by about 62.5% (from 299 to $486 \text{ U L}^{-1} \text{ h}^{-1}$), while growth rate remained constant. Additionally, the improved invertase production was mainly due to increased biomass and not cell productivity, since both batch and fed-batch cultivations have nearly similar specific growth values (2243.9 and 2194.1 U g^{-1} , respectively). On the other hand, feeding complete medium greatly enhanced process parameters. Cell growth and invertase production increased from the batch cultivation by about 143.8 and 120.1% (17.92 g L^{-1} and 32900 U L^{-1} , respectively), and from the sucrose-feeding cultivation by about 55.8 and 62.5%, respectively.



E A Elsayed & H A El Enshasy

- 583 Identification and Characterization of a Protease Encoding Metagenome Clone from Dairy Effluent

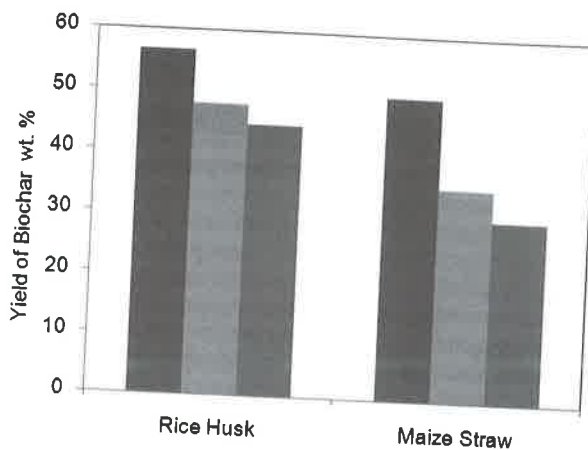
Metagenomic DNA was isolated from dairy effluent collected from a milk processing unit. The *Hpa* I digests of metagenome were cloned in pEZ BAC vector. The transformed DH5 colonies were selected by blue white screening on chloramphenicol ($25 \mu\text{g/ml}$) containing plates. Functional screening of the library on skim milk agar showed a clone having protease activity. This clone was confirmed to have a metagenome insert of size approx. 9kb. The crude cell extract of this clone at 24th h of growth showed protease activity of 166.99 U/ml ($111.32 \text{ U/mg protein}$). The protease was found to be alkaline and had maximum activity at 40°C and pH 9.0.



R Lal, KB Soni, S Alex, L Sreekantan & B R Reghunath

587 **Application of Rice Husk and Maize Straw Biochar for Carbon Sequestration and Nitrous Oxide Emission Impedement**

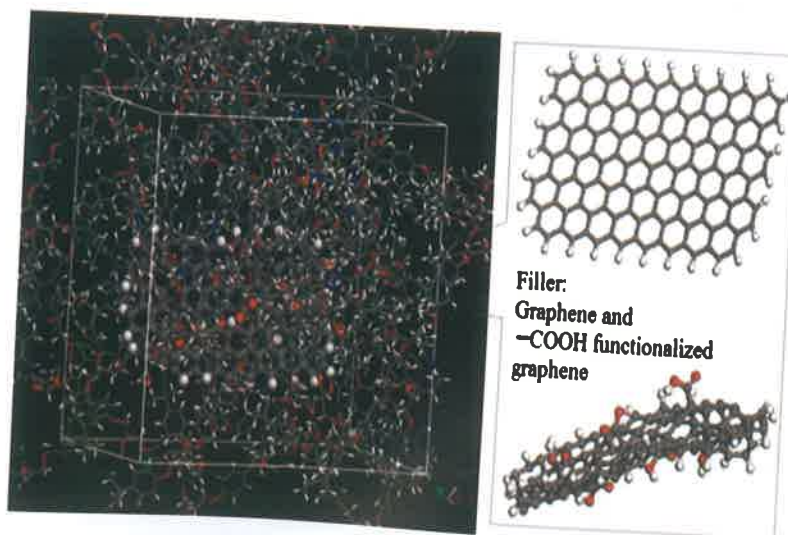
The aim of this study is to produce biochar from rice husk and maize straw by pyrolysis and to determine their carbon sequestration and CO₂ reduction potential. Studies leading to the incorporation of these biochars in the soil indicated their ability to sequester on an average of 148.67g of carbon/kg of RHB and 132.67g of carbon/kg of MSB, respectively. The potential of RHB and MSB to control the nitrous oxide emissions from the urea-fertilized soil is also investigated as a stride towards the abatement of Green House Gases (GHG).



B Tesfamichael, N Gesesse & S A Jabasingh

592 **Molecular Dynamics Simulation of Glass Transition Behavior of Polymer based Nanocomposites**

Molecular Dynamics (MD) simulations were carried out to explore the effect of functionalization of graphene on the visco-elastic properties of epoxy based nanocomposites. Pristine graphene, graphene functionalized with amine ($-NH_2$) group and carboxyl ($-COOH$) group respectively involved in this research. The simulation result shows that glass transition temperature (T_g) of the graphene epoxy based nanocomposites are higher than that of pure epoxy. The computational findings of T_g agrees well with the experimental results. Thus, the present MD simulation study can serve as good computational evidence for the existing experimental results on the T_g of graphene epoxy composites.

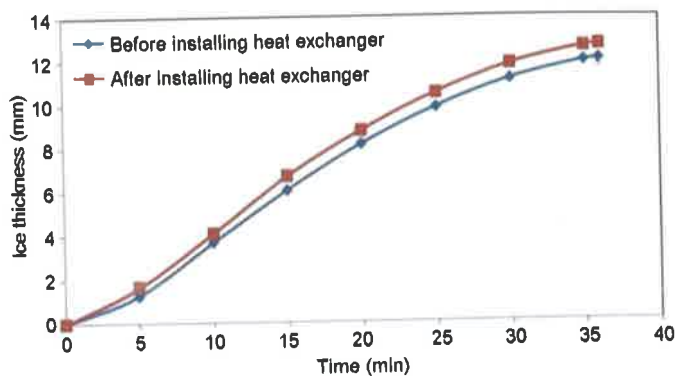


P K Singh & K Sharma

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596 Inlet Water Temperature Reduction in Ice Production Machine

This research proposes a performance improvement method of a tube ice production machine using the installation of a heat exchanger. At the end of an ice production process, there are cold rejected water from the defrost process. The cold rejected water are stored at the sump below the cooling tower. A prototype heat exchanger is submerged inside the sump. Incoming water for the next cycle was flown through the heat exchanger and are cooled before entering the cooling tower. The results showed that there are reduction in power consumption and the average production time reduced by 7.58 percent. As the system is more efficient, the machine's production capacity is increased by 6 percent while being able to reach the payback period of the investment in less than five months.



A Phongsavath, N Pannucharoenwong & C
Benjapiyaporn

Short Communication

600 Heat Transfer Enhancement in a High Power LED Heat Sink with Liquid Pockets

This study presents an experimental investigation on two types of heat sinks, a novel Heat sink with liquid pockets (HSLP) and the other one being conventional heat sink. The heat transfer characteristics of the HSLP were investigated experimentally using passive cooling method. For this purpose, an experimental setup was built by drilling longitudinal holes in the base of heat sink. The holes were filled with De-ionized (DI) water to enhance heat transfer in high-power LED COBs. The junction temperature of the LED was measured, to measure increased heat transfer. The thermal performance of aluminium heat sink with liquid pockets was studied with parameters such as fill ratio, influence of liquid cooling and orientation effect. The performance of the HSLP was found to be better than conventional heat sink of same geometry due to its lower thermal resistance. The HSLP performs better than the conventional heat sink for 15° orintation, 100 vol. % with De-ionized water. Fluid channels filled with liquid in the heat sink have a noticeable effect on heat removal rate.



B Sangmesh, K Gopalakrishna, S H
Manjunath, M N Kumar & G V kumar

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604 Instructions to contributors (Extended)

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